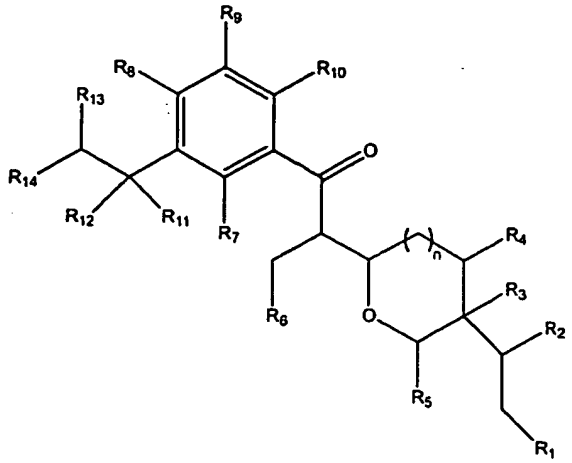
Claims

1. A compound having the structure:



or pharmaceutically acceptable derivative thereof;

wherein n is 0, 1 or 2;

R_1 is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_2 and R_3 are each independently hydrogen, or, when taken together, may be –O- or $-(CH_2)_q-$, wherein q is 1, 2 or 3;

R_4 is hydrogen, hydroxyl, protected hydroxyl or OR^i, or an aliphatic or heteroaliphatic moiety,

wherein R^i is an aliphatic or heteroaliphatic moiety;

R_5 is hydrogen, hydroxyl, protected hydroxyl or OR^{ii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{ii} is an aliphatic or heteroaliphatic moiety, or wherein R_1 and R_5, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R_6 is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_7 is hydrogen, hydroxyl, protected hydroxyl, OR^{iii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{iii} is an aliphatic or heteroaliphatic moiety;

R_8 is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R_9 is hydrogen, $-CF_3$, -CHO, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R_{10} is hydroxyl or protected hydroxyl;

R_{11} and R_{12} are each independently hydrogen, hydroxyl or OR^v, or an aliphatic or heteroaliphatic moiety, or, when taken together, may be –(C=O)-;

wherein R^v is an aliphatic or heteroaliphatic moiety;

and R_{13} and R_{14} are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

with the proviso that:

(a) when R_4, R_5, R_8 and R_{10} are each hydroxyl, R_7 is hydrogen, R_{13} and R_{14} are each methyl, R_2 and R_3, taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

(i) R_1 is methyl, R_9 is hydrogen, (R_{11}, R_{12}) is (=O) and R_6 is ethyl or isopropyl;

(ii) R_1 is methyl, R_9 is CHO, (R_{11}, R_{12}) is (OMe, H) and R_6 is ethyl, propyl or isopropyl;

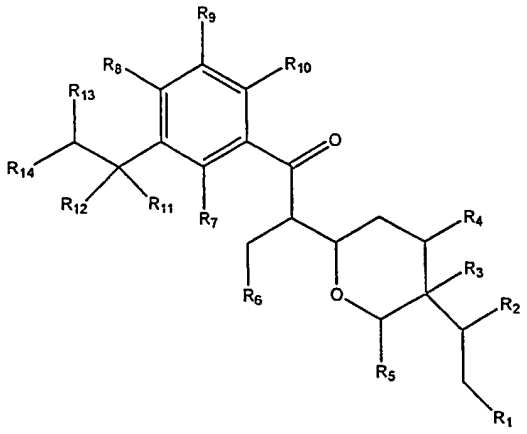
(iii) R_1 is methyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl, propyl or isopropyl;

(iv) R_1 is methyl, R_9 is $COCH_3$, R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

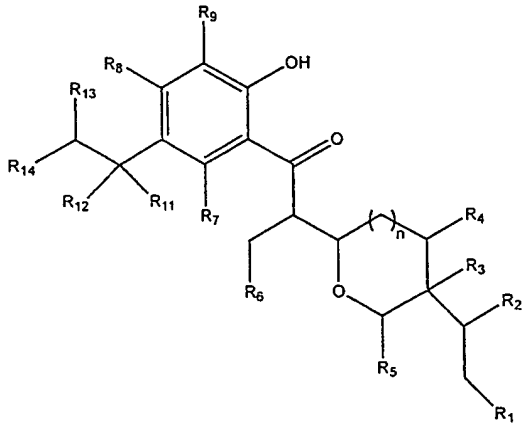
(v) R_1 is ethyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

(b) when R_1 is methyl, R_2 and R_3, taken together, form an epoxide, R_6 is ethyl, R_7 is hydrogen, (R_{11}, R_{12}) is (OMe, H), R_{13} and R_{14} are each methyl and n is 1, the following groups do not occur simultaneously as defined: R_4 and R_5 is OH or OBn, R_8 and R_{10} is OH or $-OCH_2OCH_3$ and R_9 is –CHO, $-CH_2OH$ or $-CH_2OTBS$.

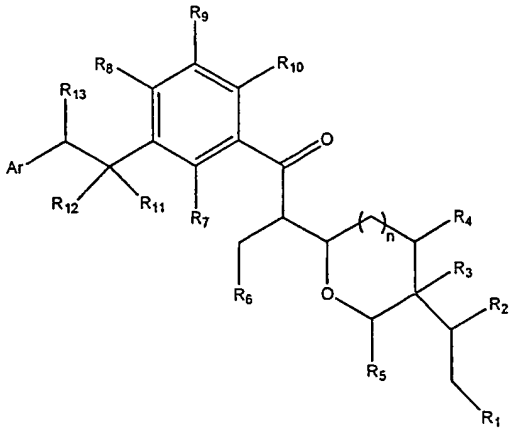
2. The compound of claim 1 wherein n is 1 and the compound has the structure:



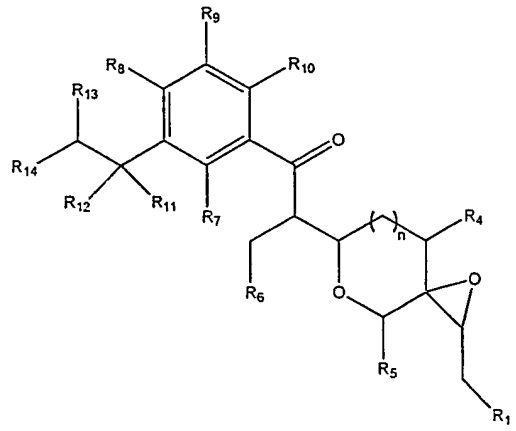
3. The compound of claim 1 wherein R_{10} is hydroxyl and the compound has the structure:



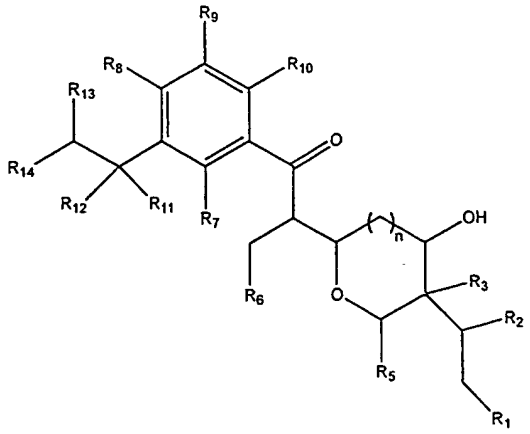
4. The compound of claim 1 wherein R_{14} is aryl and the compound has the structure:



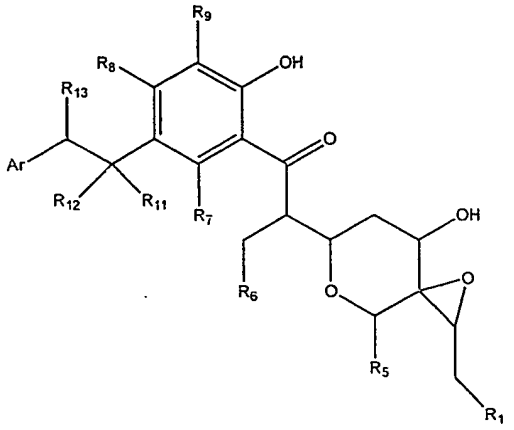
5. The compound of claim 1 wherein R_2 and R_3, taken together, form an epoxide and the compound has the structure:



6. The compound of claim 1 wherein R_4 is hydroxyl and the compound has the structure:



7. The compound of claim 1 wherein R_2 and R_3, taken together, form an epoxide, R_4 and R_{10} are each hydroxyl, R_{14} is aryl, n is 1 and the compound has the structure:



8. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_1 is hydrogen or lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

9. The compound of any one of claims 1, 2, 3, 4 or 6 wherein R_2 and R_3, taken together, form a cyclopropyl moiety.

10. The compound of any one of claims 1, 2, 3, 4 or 6 wherein R_2 and R_3, taken together, form an epoxide.

11. The compound of any one of claims 1, 2, 3, 4 or 5 wherein R_4 is hydroxyl.

12. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_5 is hydroxyl or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

13. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_6 is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

14. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, and wherein the alkyl and alkoxyl substitutents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

15. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_8 is hydrogen, hydroxyl or protected hydroxyl.

16. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_9 is –CHO or –CH_2OR^{vi}, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

17. The compound of any one of claims 1, 2, 4, 5 or 6 wherein R_{10} is hydroxyl.

18. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.

19. The compound of any one of claims 1, 2, 3, 5 or 6 wherein R_{13} and R_{14} are independently hydrogen, lower alkyl or aryl, wherein the alkyl substitutent may be

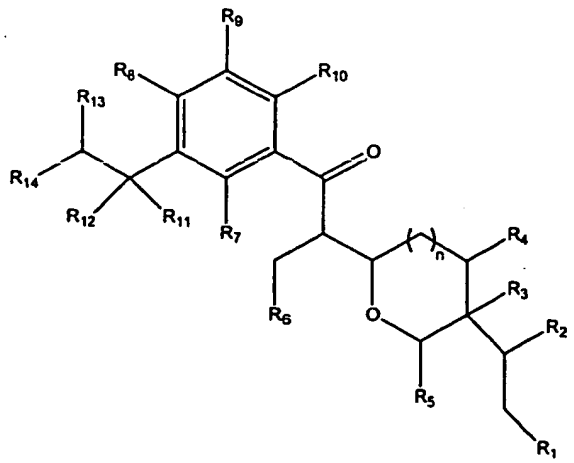
substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substitutent may be substituted or unsubstituted.

20. The compound of claim 4 or 7 wherein R_{13} is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

21. The compound of claim 7 wherein R_1 is hydrogen or lower alkyl, R_5 is hydroxyl or lower alkoxyl, R_6 is lower alkyl, R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, R_8 is hydrogen, hydroxyl or protected hydroxyl, R_9 is –CHO or $-CH_2OR^{vi}$, R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and R_{13} is lower alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety;

whereby each of the foregoing alkyl, alkoxyl, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.

22. A pharmaceutical composition comprising:
a compound having the structure:



or pharmaceutically acceptable derivative thereof; and
a pharmaceutically acceptable carrier;
wherein n is 0, 1 or 2;
R_1 is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_2 and R_3 are each independently hydrogen, or, when taken together, may be –O- or –$(CH_2)_q$- , where q is 1, 2 or 3;

R_4 is hydrogen, hydroxyl, protected hydroxyl or OR^i, or an aliphatic or heteroaliphatic moiety,

wherein R^i is an aliphatic or heteroaliphatic moiety;

R_5 is hydrogen, hydroxyl, protected hydroxyl or OR^{ii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{ii} is an aliphatic or heteroaliphatic moiety, or wherein R_1 and R_5, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R_6 is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_7 is hydrogen, hydroxyl, protected hydroxyl, OR^{iii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{iii} is an aliphatic or heteroaliphatic moiety;

R_8 is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R_9 is hydrogen, $-CF_3$, -CHO, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R_{10} is hydroxyl or protected hydroxyl;

R_{11} and R_{12} are each independently hydrogen, hydroxyl or OR^v, or an aliphatic or heteroaliphatic moiety, or, when taken together, may be –(C=O)-;

wherein R^v is an aliphatic or heteroaliphatic moiety;

and R_{13} and R_{14} are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety; and

pharmaceutically acceptable derivatives thereof;

whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

with the proviso that when R_4, R_5, R_8 and R_{10} are each hydroxyl, R_7 is hydrogen, R_{13} and R_{14} are each methyl, R_2 and R_3, taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

(i) R_1 is methyl, R_9 is hydrogen, (R_{11}, R_{12}) is (=O) and R_6 is ethyl or isopropyl;

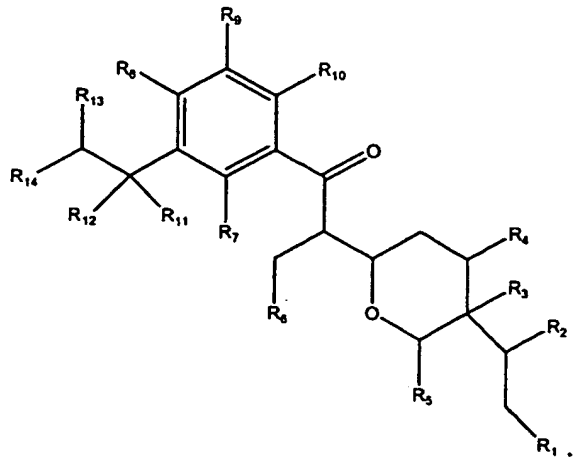
(ii) R_1 is methyl, R_9 is CHO, (R_{11}, R_{12}) is (OMe, H) and R_6 is ethyl, propyl or isopropyl;

(iii) R_1 is methyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl, propyl or isopropyl;

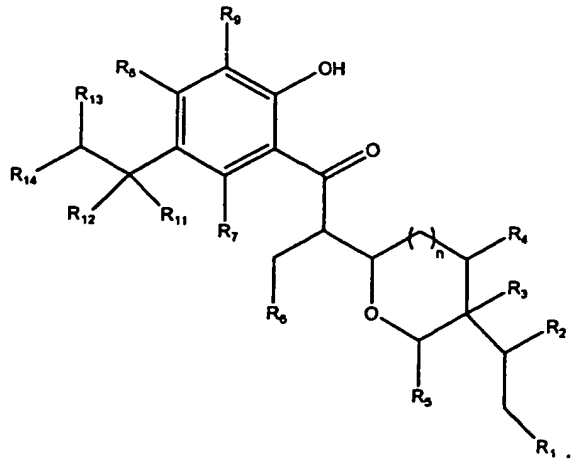
(iv) R_1 is methyl, R_9 is $COCH_3$, R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

(v) R_1 is ethyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl.

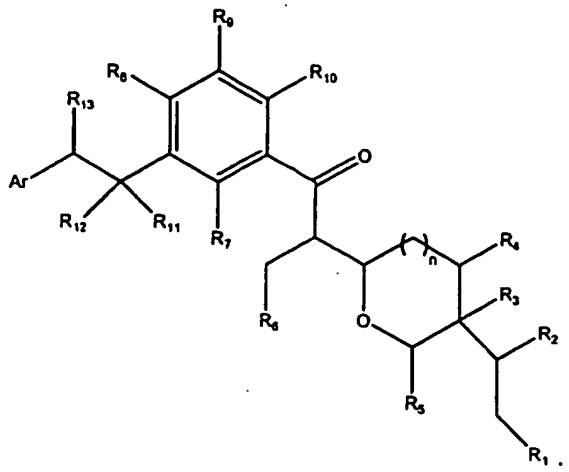
23. The pharmaceutical composition of claim 22 wherein n is 1 and the compound has the structure:



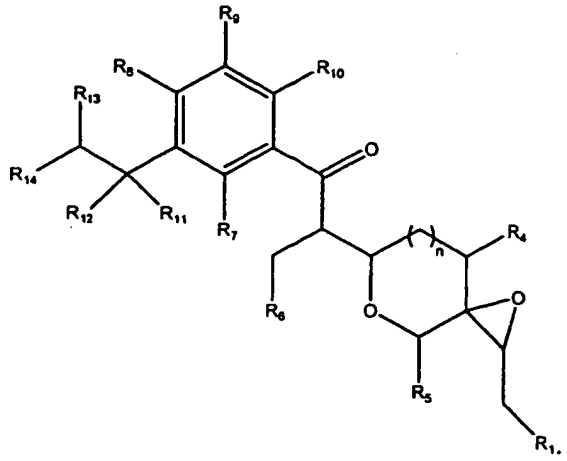
24. The pharmaceutical composition of claim 22 wherein R_{10} is hydroxyl and the compound has the structure:



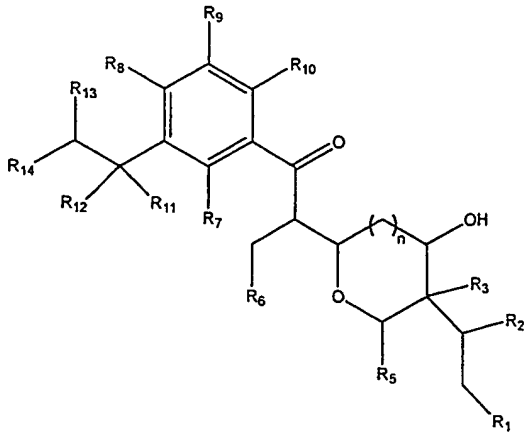
25. The pharmaceutical composition of claim 22 wherein R_{14} is aryl and the compound has the structure:



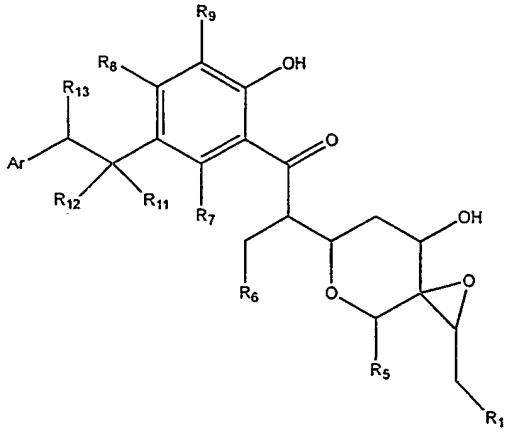
26. The pharmaceutical composition of claim 22 wherein R_2 and R_3, taken together, form an epoxide, and the compound has the structure:



27. The pharmaceutical composition of claim 22 wherein R_4 is hydroxyl and the compound has the structure:



28. The pharmaceutical composition of claim 22 wherein R_2 and R_3, taken together, form an epoxide, R_4 and R_{10} are each hydroxyl, R_{14} is aryl, n is 1 and the compound has the structure:



29. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_1 is hydrogen or lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

30. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 27 wherein R_2 and R_3, taken together, form a cyclopropyl moiety.

31. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 27 wherein R_2 and R_3, taken together, form an epoxide.

32. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 26 wherein R_4 is hydroxyl.

33. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_5 is hydroxyl or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

34. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_6 is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

35. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, and wherein the alkyl and alkoxyl substitutents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

36. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_8 is hydrogen, hydroxyl or protected hydroxyl.

37. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_9 is –CHO or $-CH_2OR^{vi}$, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

38. The pharmaceutical composition of any one of claims 22, 23, 25, 26 or 27 wherein R_{10} is hydroxyl.

39. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.

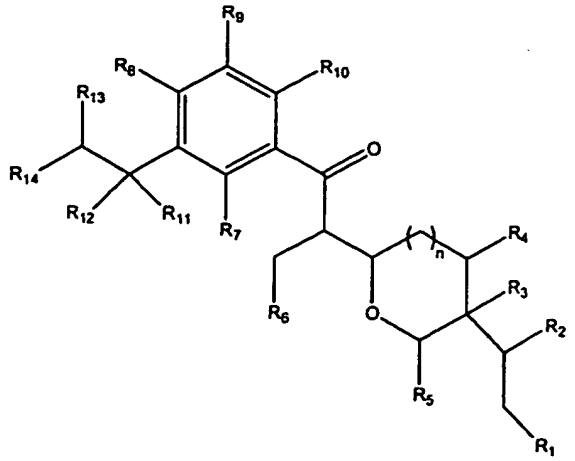
40. The pharmaceutical composition of any one of claims 22, 23, 24, 26 or 27 wherein R_{13} and R_{14} are independently hydrogen, lower alkyl or aryl, wherein the alkyl substitutent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substitutent may be substituted or unsubstituted.

41. The pharmaceutical composition of claim 25 or 28 wherein R_{13} is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

42. The pharmaceutical composition of claim 28 wherein R_1 is hydrogen or lower alkyl, R_5 is hydroxyl or lower alkoxyl, R_6 is lower alkyl, R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, R_8 is hydrogen, hydroxyl or protected hydroxyl, R_9 is –CHO or $-CH_2OR^{vi}$, R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and R_{13} is lower alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety;

whereby each of the foregoing alkyl, alkoxyl, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.

43. A method for treating cancer comprising:
administering to a subject in need thereof a therapeutically effective amount of a compound having the structure:



or pharmaceutically acceptable derivative thereof;

wherein n is 0, 1 or 2;

R_1 is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_2 and R_3 are each independently hydrogen, or, when taken together, may be –O- or $-(CH_2)_q-$, where q is 1, 2 or 3;

R_4 is hydrogen, hydroxyl, protected hydroxyl or OR^i, or an aliphatic or heteroaliphatic moiety,

wherein R^i is an aliphatic or heteroaliphatic moiety;

R_5 is hydrogen, hydroxyl, protected hydroxyl or OR^{ii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{ii} is an aliphatic or heteroaliphatic moiety, or wherein R_1 and R_5, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R_6 is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R_7 is hydrogen, hydroxyl, protected hydroxyl, OR^{iii}, or an aliphatic or heteroaliphatic moiety,

wherein R^{iii} is an aliphatic or heteroaliphatic moiety;

R_8 is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R_9 is hydrogen, $-CF_3$, -CHO, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R_{10} is hydroxyl or protected hydroxyl;

R_{11} and R_{12} are each independently hydrogen, hydroxyl or OR^v, or an aliphatic or heteroaliphatic moiety, or, when taken together, may be –(C=O)-;

wherein R^v is an aliphatic or heteroaliphatic moiety;

and R_{13} and R_{14} are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

with the proviso that when R_4, R_5, R_8 and R_{10} are each hydroxyl, R_7 is hydrogen, R_{13} and R_{14} are each methyl, R_2 and R_3, taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

(i) R_1 is methyl, R_9 is hydrogen, (R_{11}, R_{12}) is (=O) and R_6 is ethyl or isopropyl;

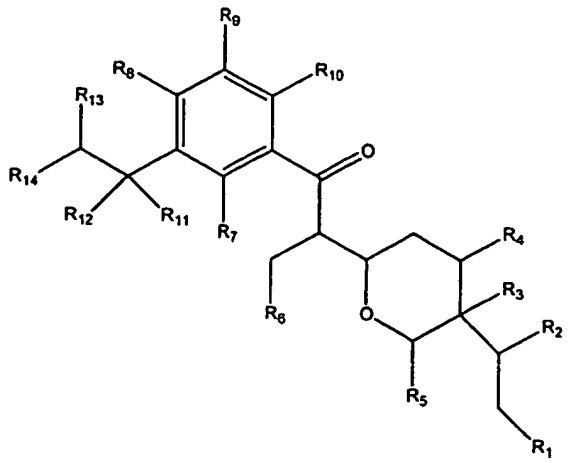
(ii) R_1 is methyl, R_9 is CHO, (R_{11}, R_{12}) is (OMe, H) and R_6 is ethyl, propyl or isopropyl;

(iii) R_1 is methyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl, propyl or isopropyl;

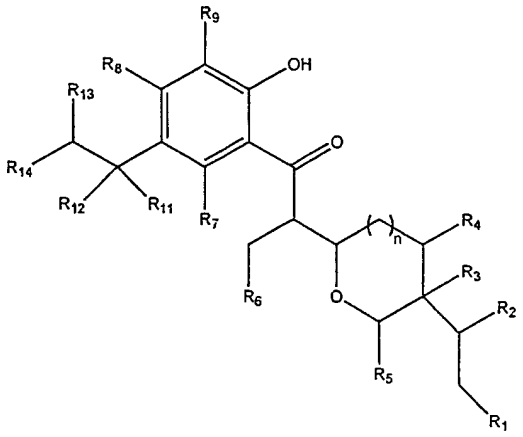
(iv) R_1 is methyl, R_9 is $COCH_3$, R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

(v) R_1 is ethyl, R_9 is CHO, R_{11} and R_{12} are hydrogen and R_6 is ethyl.

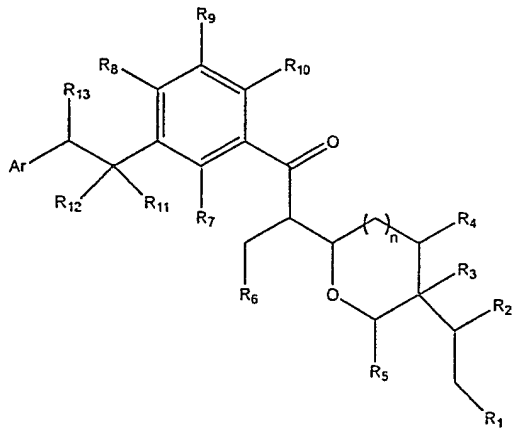
45. The method of claim 43 wherein in the compound n is 1 and the compound has the structure:



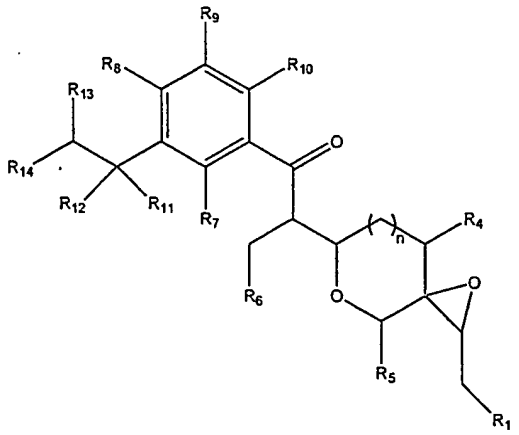
46. The method of claim 43 wherein in the compound R_{10} is hydroxyl and the compound has the structure:



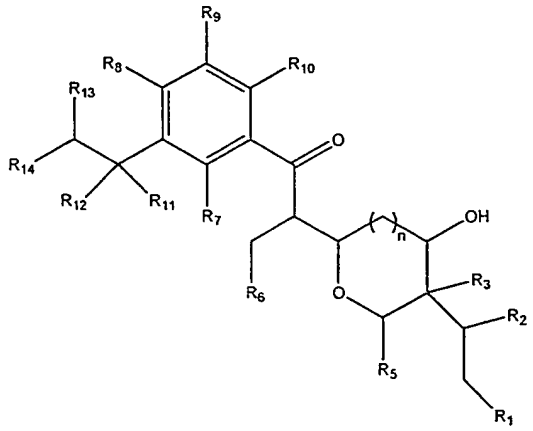
47. The method of claim 43 wherein in the compound R_{14} is aryl and the compound has the structure:



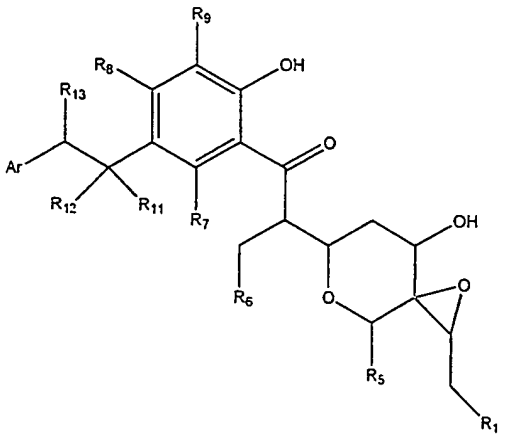
48. The method of claim 43 wherein in the compound R_2 and R_3, taken together, form an epoxide and the compound has the structure:



49. The method of claim 43 wherein in the compound R_4 is hydroxyl and the compound has the structure:



50. The method of claim 43 wherein in the compound R_2 and R_3, taken together, form an epoxide, R_4 and R_{10} are each hydroxyl, R_{14} is aryl, n is 1 and the compound has the structure:



51. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_1 is hydrogen or lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

52. The method of any one of claims 43, 44, 45, 46, 47 or 49 wherein in the compound R_2 and R_3, taken together, form a cyclopropyl moiety.

53. The method of any one of claims 43, 44, 45, 46, 47 or 49 wherein in the compound R_2 and R_3, taken together, form an epoxide.

54. The method of any one of claims 43, 44, 45, 46, 47 or 48 wherein in the compound R_4 is hydroxyl.

55. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_5 is hydroxyl or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

56. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_6 is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

57. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, and wherein the alkyl and alkoxyl substitutents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

58. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_8 is hydrogen, hydroxyl or protected hydroxyl.

59. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_9 is –CHO or $-CH_2OR^{vi}$, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

60. The method of any one of claims 43, 44, 45, 47, 48 or 49 wherein in the compound R_{10} is hydroxyl.

61. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and wherein the alkoxyl substitutent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.

62. The method of any one of claims 43, 44, 45, 46, 48 or 49 wherein in the compound R_{13} and R_{14} are independently hydrogen, lower alkyl or aryl, wherein the alkyl substitutent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substitutent may be substituted or unsubstituted.

63. The method of claim 47 or 50 wherein in the compound R_{13} is lower alkyl, and wherein the alkyl substitutent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

64. The method of claim 50 wherein in the compound R_1 is hydrogen or lower alkyl, R_5 is hydroxyl or lower alkoxyl, R_6 is lower alkyl, R_7 is hydrogen, hydroxyl, lower alkyl or lower alkoxyl, R_8 is hydrogen, hydroxyl or protected hydroxyl, R_9 is –CHO or $-CH_2OR^{vi}$, R_{11} and R_{12} are independently hydrogen or lower alkoxyl, and R_{13} is lower

alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety;

whereby each of the foregoing alkyl, alkoxyl, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.